



# TEST REPORT

**Reference No.**..... : WTD21D01001248E

**Applicant**..... : Shenzhen Ebelong Technology Co.,Ltd

**Address**..... : 4th Floor, Building 3, Hengmingzhu Technology Industrial Park, Xinqiao  
Tongfuyu Industrial district, Gonghe community, Shajing subdistrict,  
Bao'an, Shenzhen, Guangdong, China

**Manufacturer**..... : Shenzhen Ebelong Technology Co.,Ltd

**Address**..... : 4th Floor, Building 3, Hengmingzhu Technology Industrial Park, Xinqiao  
Tongfuyu Industrial district, Gonghe community, Shajing subdistrict,  
Bao'an, Shenzhen, Guangdong, China

**Product**..... : Wireless Receiving Controller

**Model(s)**..... : ERC102, KRC-102

**Standards**..... : EN 55032:2015  
EN 55035:2017  
EN IEC 61000-3-2:2019  
EN 61000-3-3:2013+A1:2019

**Date of Receipt sample** ... : 2021-01-06

**Date of Test**..... : 2021-01-06 to 2021-02-04

**Date of Issue**..... : 2021-02-22

**Test Result**..... : **Pass**

**Remarks:**

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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## 2 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD21D01001248E	2021-01-06	2021-01-06 to 2021-02-04	2021-02-22	Original	-	Valid

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### 3 General Information

#### 3.1 General Description of E.U.T.

Product ..... : Wireless Receiving Controller  
Model(s) ..... : ERC102, KRC-102  
Model Difference ..... : Only model name is different, the test sample model name is ERC 102.  
Remark ..... : Model ERC102 was tested in this report.

#### 3.2 Details of E.U.T.

Ratings ..... : AC 220-240V, 50/60Hz

#### 3.3 Description of Support Units

Product Name	Model	Description
WirelessSwitch	ES2154; KS2-154	White, 1key
	ES2254; KS2-254	White, 2key
	ES2354; KS2-354	White, 3key
	EM1350; KM1-350	White, 6key
	EM1300	Black, 6key
	EK1100; K1-1100	Black, 1key
	EP1454; LE454-RF	White, 4key
	ES3454-2R; ES3454-RF	White, 4key

#### 3.4 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

#### 3.5 Abnormalities from Standard Conditions

None.



## 4 Test Summary

EMISSION(EN 55032)		
Test Item	Test Standard	Result
Conducted Emissions from the AC mains power ports 150KHz to 30MHz	EN 55032	Pass
Asymmetric Mode Conducted Emissions 150KHz to 30MHz	EN 55032	N/A
Conducted Differential Voltage Emissions 30MHz to 2150MHz	EN 55032	N/A
Radiated Emissions, 30MHz to 1000MHz	EN 55032	Pass
Radiated Emissions, Above 1GHz	EN 55032	Pass
Harmonic Current	EN IEC 61000-3-2	Pass
Voltage Fluctuation and Flicker	EN61000-3-3	Pass
IMMUNITY(EN 55035)		
Test Item	Test Method	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2	Pass
Radiation Immunity	IEC 61000-4-3	Pass
Electrical Fast Transients (EFT)	IEC 61000-4-4	Pass
Surges	IEC 61000-4-5	Pass
Injected Currents	IEC 61000-4-6	Pass
Power-frequency magnetic fields	IEC61000-4-8	N/A*
Voltage Dips and Voltage interruptions	IEC 61000-4-11	Pass

Remark:

Pass

Fail

N/A

\*

Test item meets the requirement

Test item does not meet the requirement

Test case does not apply to the test object

Applicable only to equipment containing devices intrinsically susceptible to magnetic fields, such as CRT monitors, Hall effect elements, electro-dynamic microphones, magnetic field sensors or audio frequency transformers.



## 5 Equipment Used during Test

### 5.1 Equipment List

Conducted emissions from the AC mains power ports						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	100947	2020.07.30	2021.07.29
2	LISN	R&S	ENV216	100115	2020.07.30	2021.07.29
3	Cable	Top	TYPE16(3.5M)	-	2020.07.30	2021.07.29
3m Semi-anechoic Chamber for Radiation (Below 1GHz) TDK						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2020.04.20	2021.04.19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2020.04.25	2021.04.24
3	Amplifier	ANRITSU	MH648A	M43381	2020.04.20	2021.04.19
4	Cable	HUBER+SUHNER	CBL2	525178	2020.04.20	2021.04.19
3m Fully Anechoic Room for Radiation (Above 1GHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2020.04.20	2021.04.19
2	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2020.04.25	2021.04.24
3	Broadband Pre-amplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2020.04.20	2021.04.19
4	Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2020.04.20	2021.04.19
Harmonics and Flicker Measuring System						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Digital Power Analyzer	SCHAFFNER	CCN 1000-1	72625	2020.04.20	2021.04.19
2	Power Source	SCHAFFNER	NSG 1007	58477	2020.04.20	2021.04.19
Electrostatic Discharge						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Electrostatic Discharge Simulator	SCHLODER	SESD 216	606144	2020.04.24	2021.04.23
Radio-frequency electromagnetic fields						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last	Calibration



					Calibration Date	Due Date
1	Signal Generater	R&S	SMB100A	105942	2020.07.30	2021.07.29
2	RF Power Amplifier	BONN Elektronik	BLWA0830-160/100/40D	128740	2020.07.30	2021.07.29
3	GestockteBreitband (S tacked ) Log.-per.Antenna	SCHWARZBECK	STLP9128D	043	2020.07.30	2021.07.29
4	Power Meter	R&S	NRP2	102031	2020.04.20	2021.04.19
5	Amplifier	NJNT	NTWPAS-2560025	2560025	2020.04.20	2021.04.19
<b>Surge, EFT, Voltage dips and Interruption</b>						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	All Modules Generator	SCHAFFNER	6150	34579	2020.07.30	2021.07.29
2	Capacitive Coupling Clamp	SCHAFFNER	CDN 8014	25311	2020.07.30	2021.07.29
3	Signal and Data Line Coupling Network	SCHAFFNER	CDN 117	25627	2020.07.30	2021.07.29
4	AC Power Supply	HENGYUAN	DTDGC-4	-	2020.07.30	2021.07.29
<b>Conducted Immunity</b>						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	RF Generator	TESEQ	NSG4070	25781	2020.07.30	2021.07.29
2	CDN M-Type	TESEQ	CDN M016	25112	2020.07.30	2021.07.29
3	EM-Clamp	TESEQ	KEMZ 801	25453	2020.07.30	2021.07.29
4	Attenuator 6dB	TESEQ	ATN6050	25376	2020.07.30	2021.07.29

## 5.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/



### 5.3 Measurement Uncertainty

Parameter	Uncertainty (Note 1)
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conducted Emission (150kHz-30MHz)	$\pm 3.64\text{dB}$
Radiated Emission(30MHz-1000MHz)	$\pm 5.03\text{dB}$
Radiated Emission(1GHz~18GHz)	$\pm 5.47\text{dB}$

Note 1: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

### 5.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

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## 5.5 Test Mode

Test Item	Test Mode	Test Voltage
<b>EN 55032</b>		
CE (150KHz-30MHz)	Working mode	AC 230V/50Hz
RE (30MHz-1GHz)	Working mode	AC 230V/50Hz
RE (1GHz-6GHz)	Working mode	AC 230V/50Hz
<b>EN 61000-3-2</b>		
Harmonic Current	Working mode	AC 230V/50Hz
<b>EN 61000-3-3</b>		
Voltage Fluctuations and Flicker	Working mode	AC 230V/50Hz
<b>EN 55035</b>		
ESDAir Discharge: $\pm 8\text{Kv}$ ContactDischarge: $\pm 4\text{kV}$ HCP &VCP: $\pm 4\text{kV}$ Performance Criterion B	Working mode	AC 230V/50Hz
R/S3V/m,80%AM(1kHz), 80MHz to 1GHz, 1.8GHz, 2.6GHz, 3.5GHz, 5GHz Performance Criterion A	Working mode	AC 230V/50Hz
EFT 1kV Performance Criterion B	Working mode	AC 230V/50Hz
Surges 1.2/50 us Open Circuit Voltage, 8/20 us Short Circuit Current,line to line 1 kV,line to earth 2kV Performance Criterion B	Working mode	AC 230V/50Hz
C/S0.15MHz to 10MHz for 3V r.m.s. 10MHz to 30MHz for 3 to 1Vr.m.s.30MHz to 80MHz for 1V r.m.s. Performance Criterion A	Working mode	AC 230V/50Hz
Voltage Dips Less 5% 0.5P Performance Criterion B  70%25P for 50Hz 30P for 60Hz Performance Criterion C  Interruptionsless5%250P for 50Hz300p for 60Hz Performance Criterion C	Working mode	AC 230V/50Hz
** shows the worst case mode which were recorded in this report.		



## 6 Emission Test Results

### 6.1 Conducted emissions from the AC mains power ports

Test Requirement..... : EN 55032

Test Method..... : EN 55032

Frequency Range..... : 150kHz to 30MHz

Class/Severity..... : Class B/Table A.10 of EN 55032

Test Result..... : ☒ Pass ☐ Fail ☐ not applicable (Remark)

#### 6.1.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.4°C

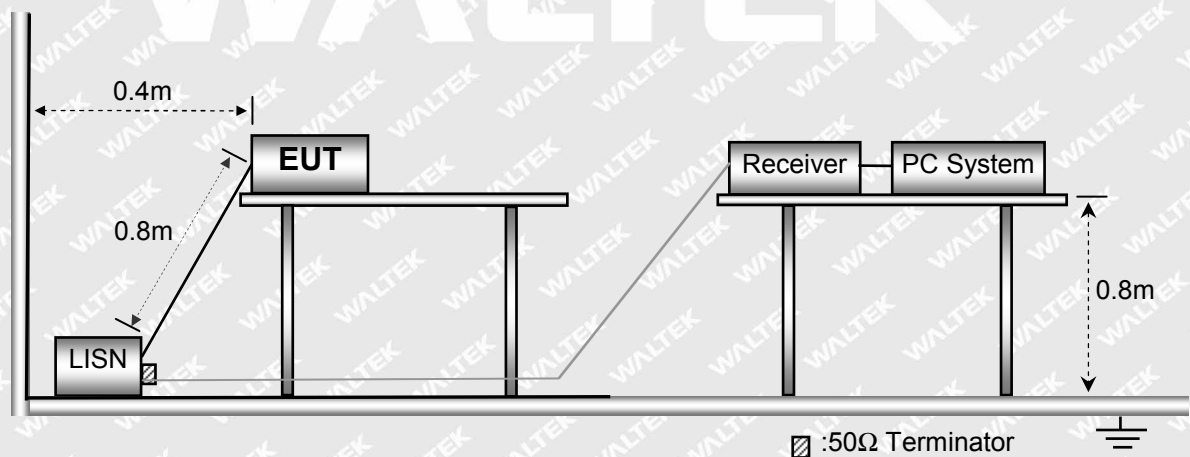
Humidity..... : 53.1%RH

Atmospheric Pressure..... : 101.3kPa

EUT Operation..... : Refer to section 5.5.

#### 6.1.2 Block Diagram of Test Setup

The Conducted emissions from the AC mains power ports tests were performed in accordance with the EN 55032.



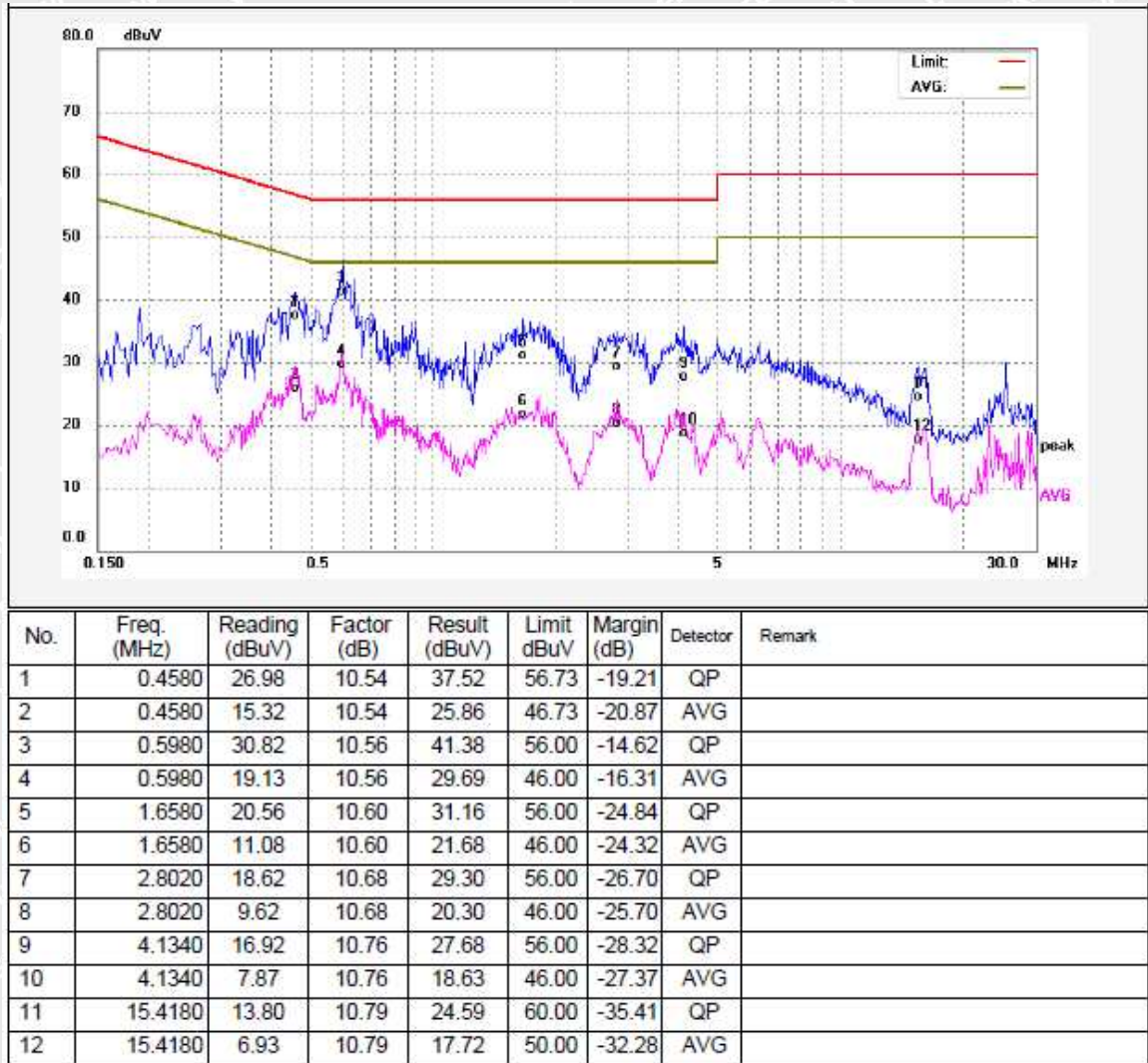
#### 6.1.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



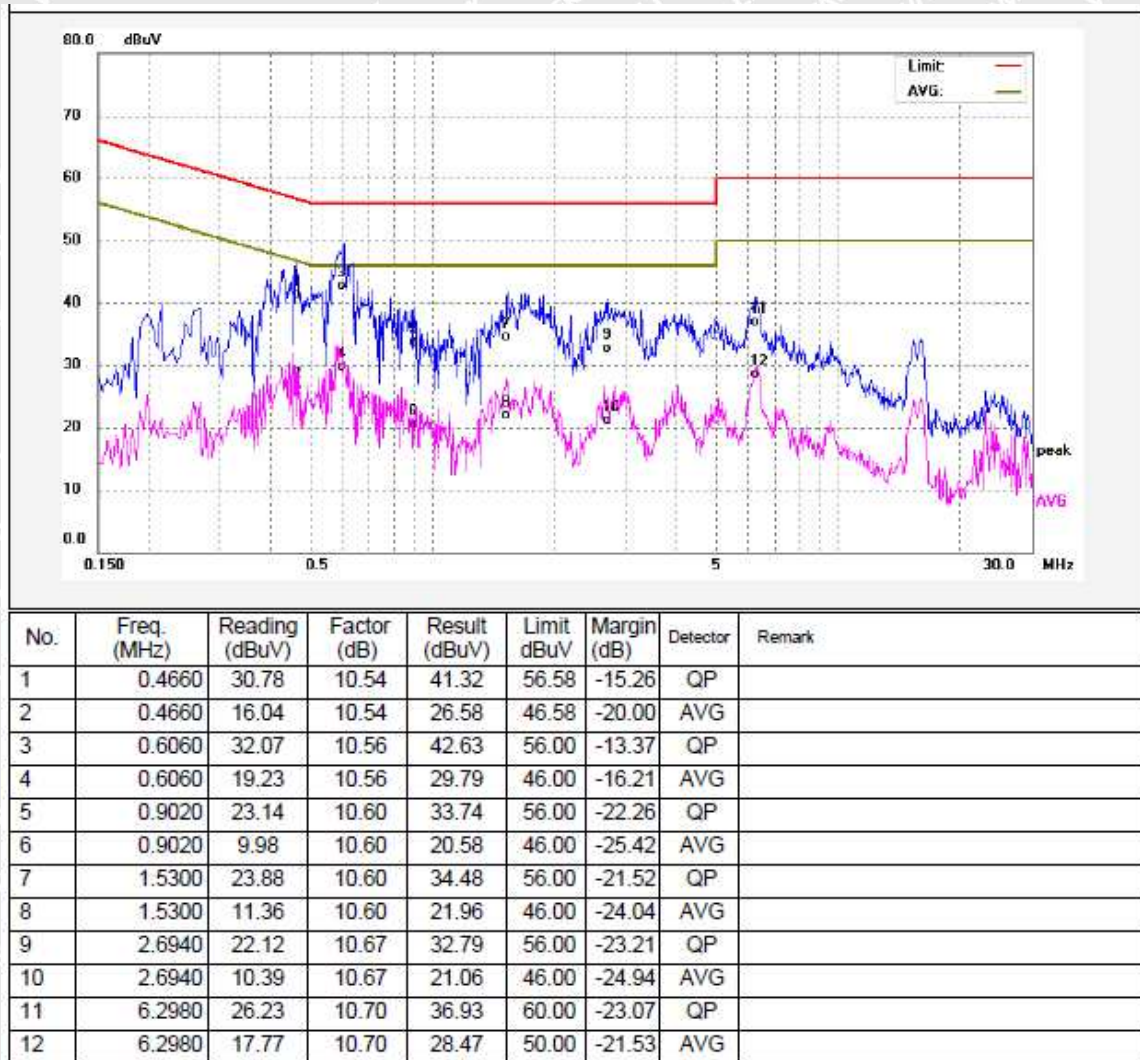
### 6.1.4 Test Data

Live Line:





Neutral Line:





## 6.2 Radiated Emissions, 30-1000MHz

Test Requirement..... : EN 55032  
 Test Method..... : EN 55032  
 Frequency Range ..... : 30MHz to 1000MHz  
 Class/Severity..... : Class B/ Table A.4 of EN 55032  
 Test Result ..... : ☒ Pass ☐ Fail ☐ not applicable (Remark)

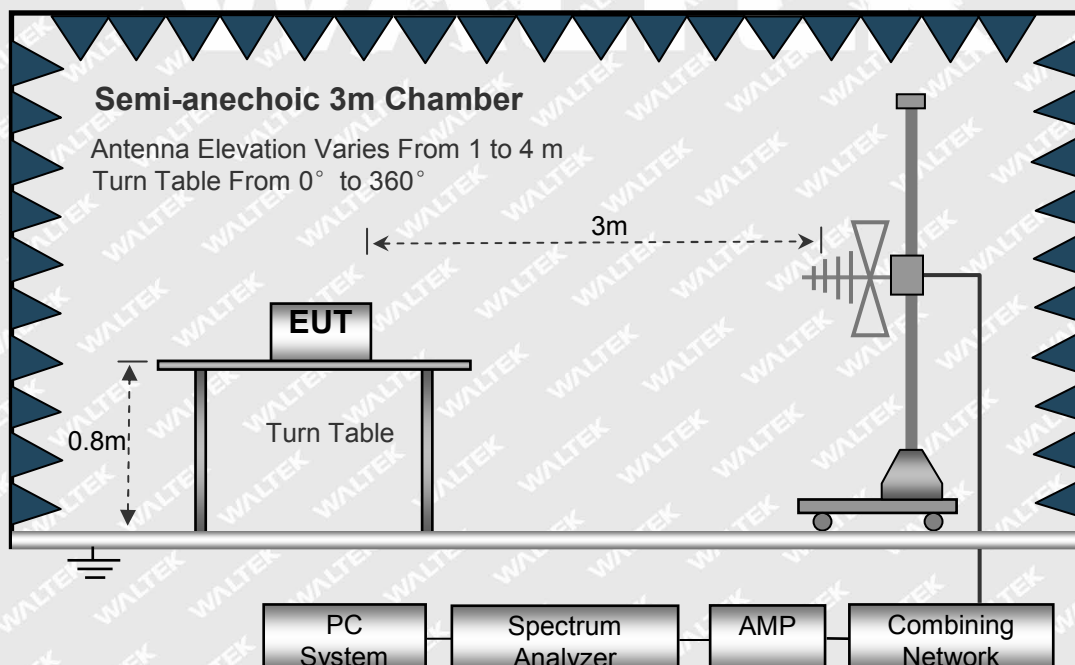
### 6.2.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.1°C  
 Humidity..... : 54.8%RH  
 Atmospheric Pressure ..... : 101.5kPa  
 EUT Operation..... : Refer to section 5.5.

### 6.2.2 Block Diagram of Test Setup

The Radiation Emission test was performed in accordance with EN 55032.



### 6.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Quasi-peak measurements were performed if peak emissions were within 6dB of the Quasi-peak limit line.



### 6.2.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

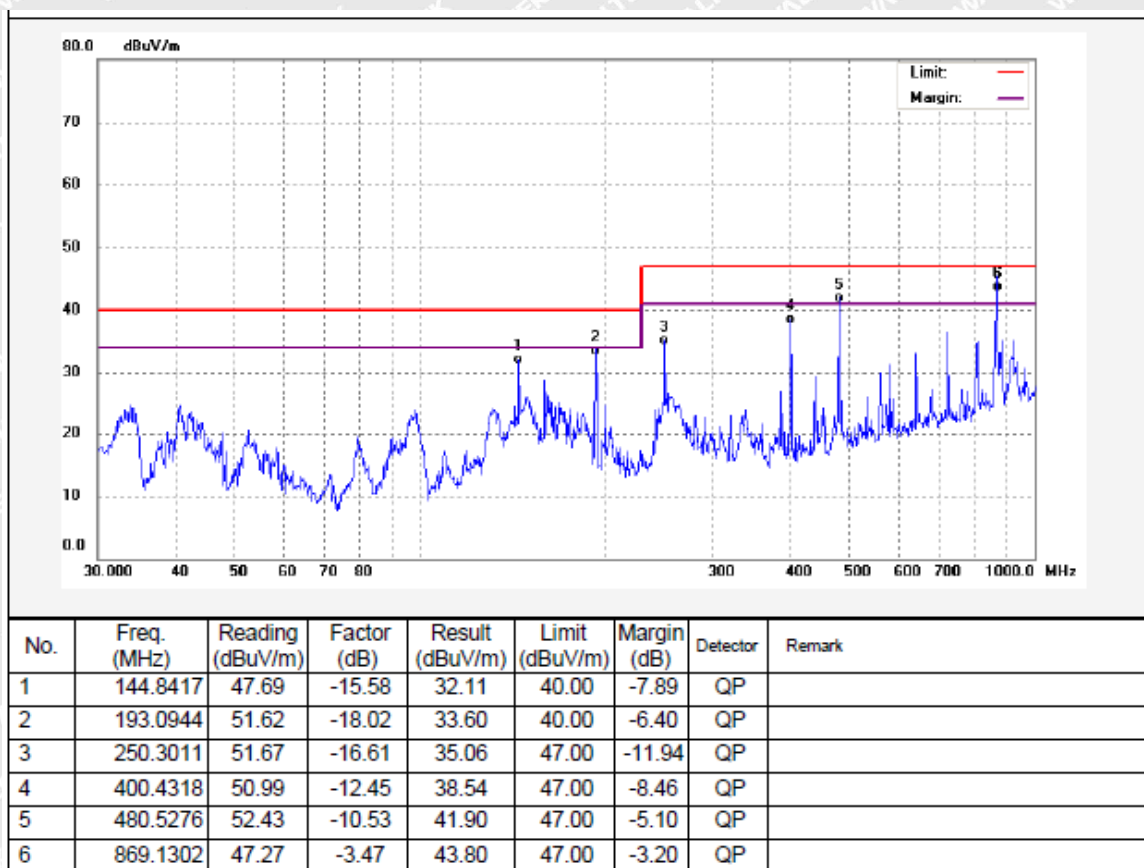
$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB means the emission is 6dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

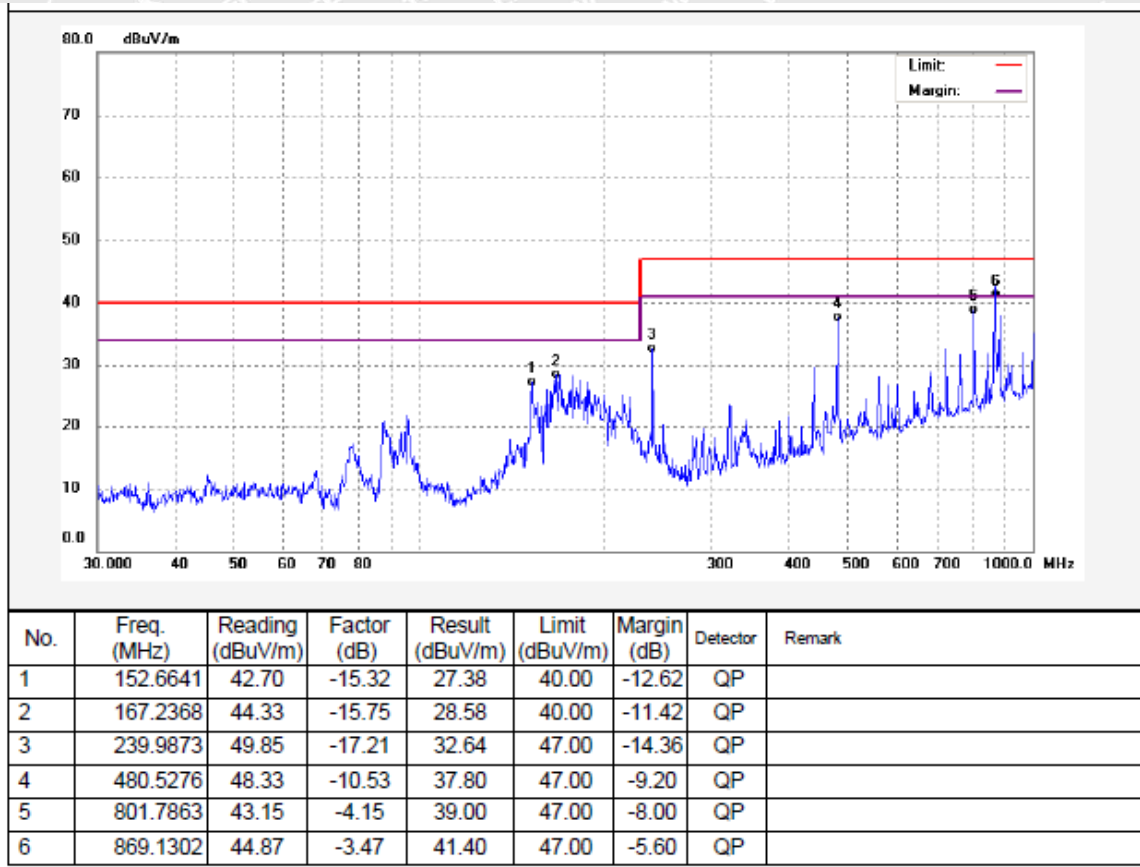
### 6.2.5 Test Data

Antenna Polarization: Vertical





Antenna Polarization: Horizontal





### 6.3 Radiation Emission, Above 1000MHz

Test Requirement..... : EN 55032  
 Test Method..... : EN 55032  
 Frequency Range..... : Above 1000MHz  
 Class/Severity..... : Class B/ Table A.5 of EN 55032  
 Test Result ..... : ☒ Pass ☐ Fail ☐ not applicable (Remark)

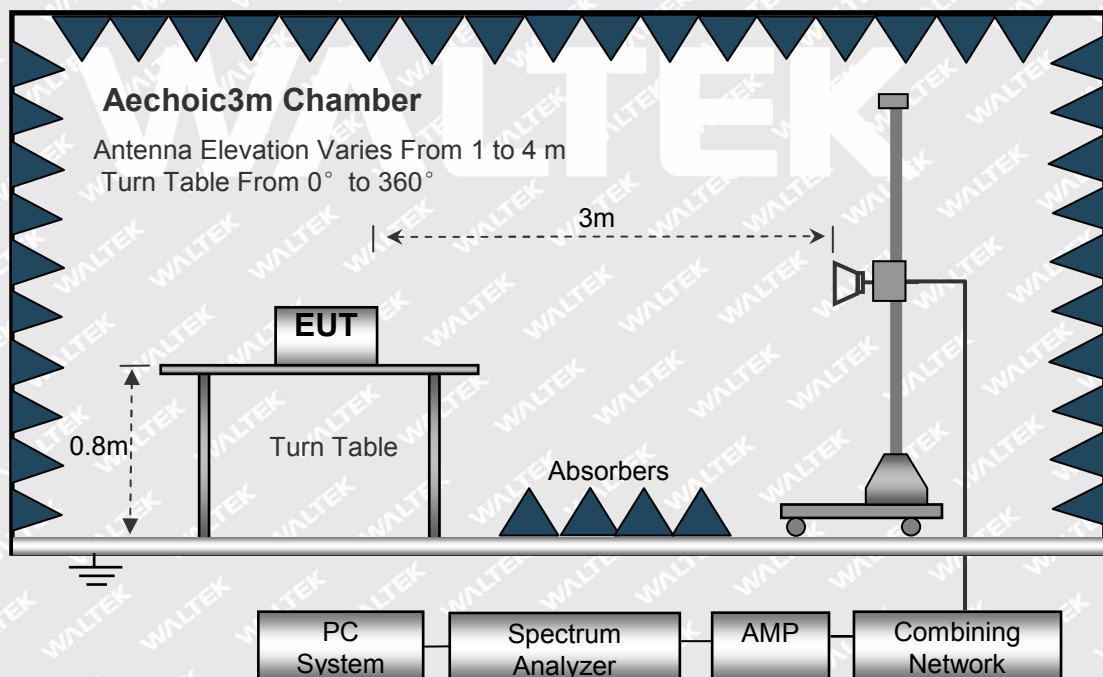
#### 6.3.1E.U.T. Operation

Operating Environment:

Temperature..... : 23.5°C  
 Humidity..... : 52.3%RH  
 Atmospheric Pressure..... : 101.3kPa  
 EUT Operation..... : Refer to section 5.5.

#### 6.3.2Block Diagram of Test Setup

The RadiationEmissiontest was performed in accordance with EN 55032.



#### 6.3.3Measurement Data

The maximised peak emissions from the EUT was scanned and measured for both the Antenna Vertical Polarization and Antenna Horizontal Polarization. Average measurements were performed if peak emissions were within 6dB of the average limit line.

The test Frequency range judgment basis:

If the highest frequency of the internal sources of the EUT is less than 108 MHz, the



measurement shall only be made up to 1 GHz.

If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.

If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.

If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

### 6.3.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit.

For example, a margin of -6dB means the emission is 6dB below the maximum limit. The equation for margin calculation is as follows:

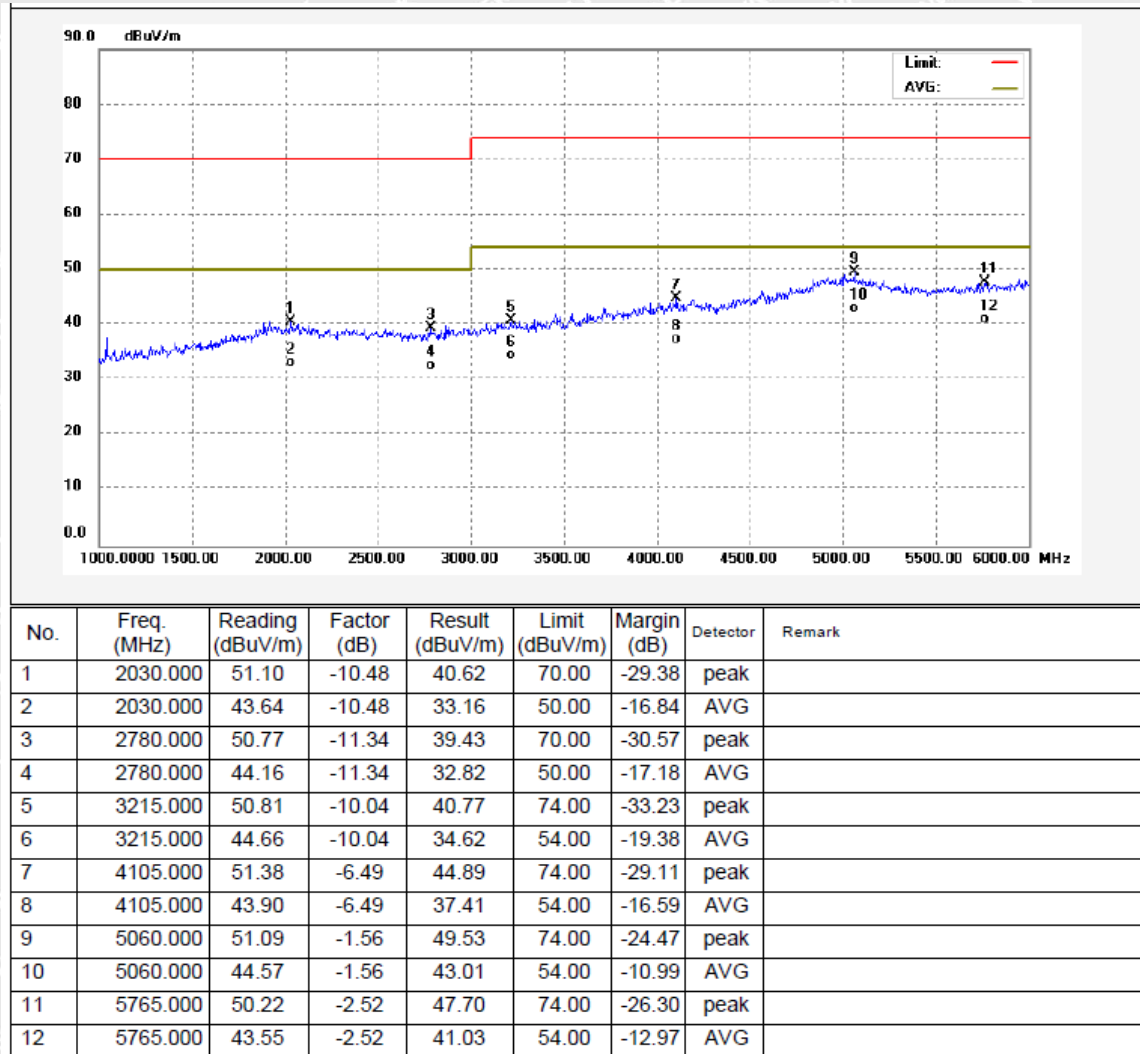
$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

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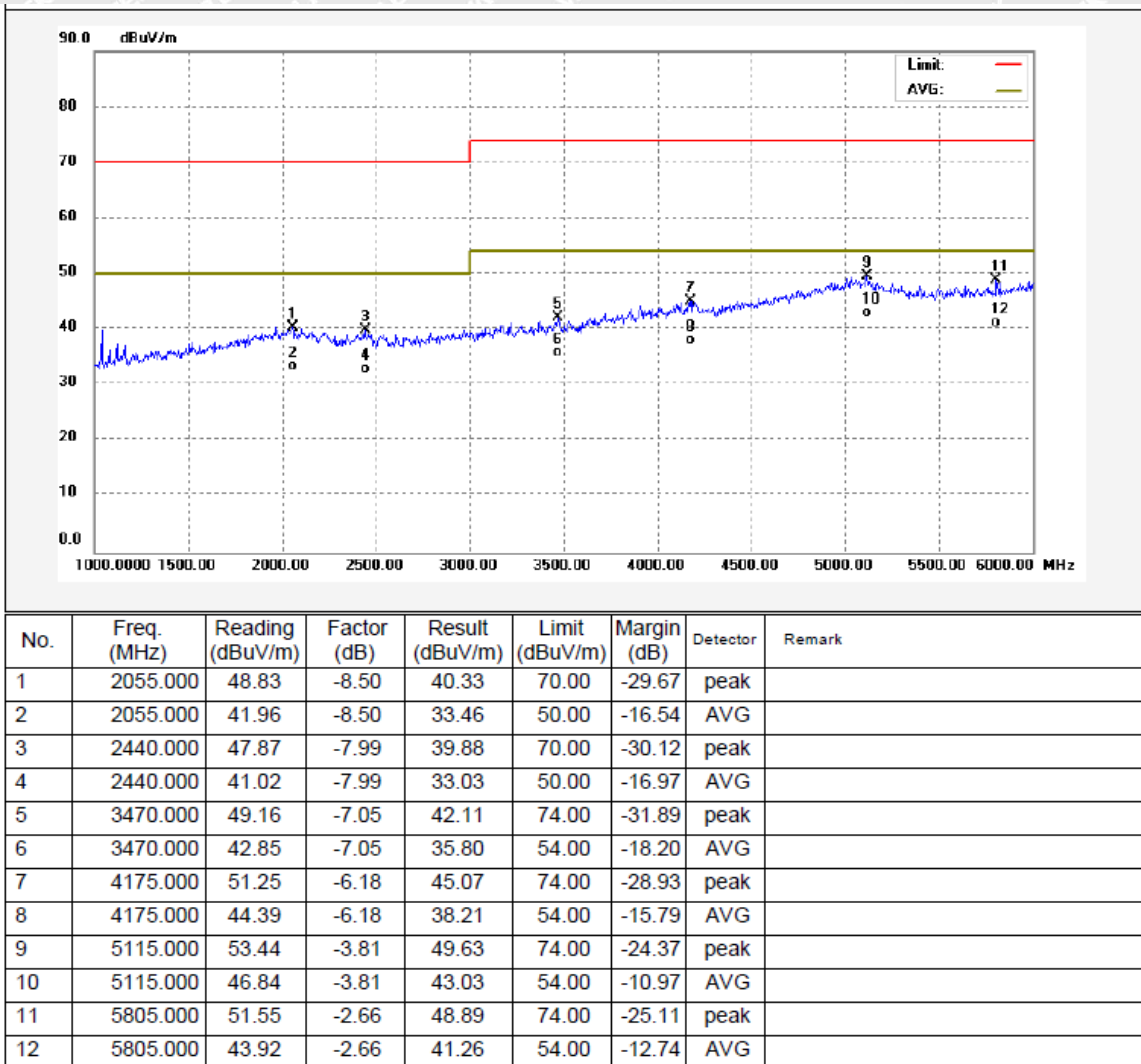
### 6.3.5 Test Data

Antenna Polarization: Vertical





Antenna Polarization: Horizontal





## 6.4 Harmonics Current Emission

Test Requirement..... : EN IEC 61000-3-2

Test Method..... : EN61000-4-7

Class/Severity..... : ☐ Class A ☐ Class B ☐ Class C ☒ Class D

Test Result ..... : ☒ Pass ☐ Fail ☐ not applicable (Remark)

### 6.4.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.5°C

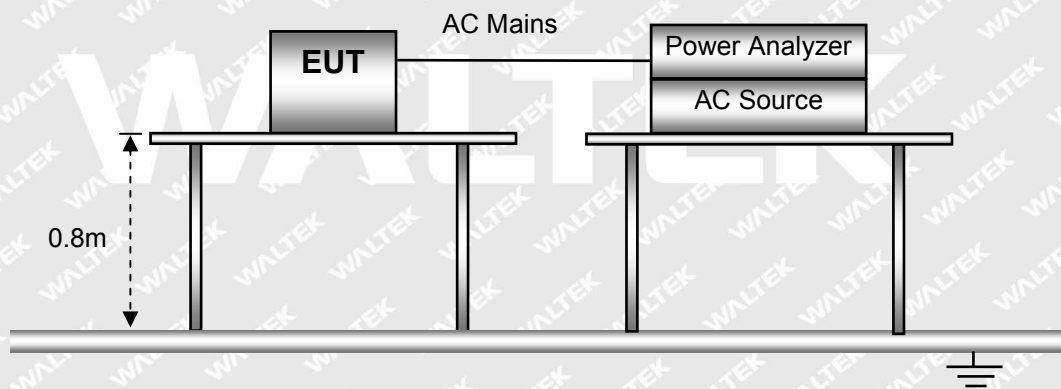
Humidity..... : 52.3%RH

Atmospheric Pressure..... : 101.3kPa

EUT Operation..... : Refer to section 5.5.

### 6.4.2 Block Diagram of Test Setup

The Harmonics Current emission test was performed in accordance with EN 61000-4-7.





### 6.4.3 Harmonic Current Emission Test Data

#### Harmonics – Class-A per Ed. 5.0 (2018)(Run time)

EUT: Wireless Receive Controller

Test category: Class-A per Ed. 5.0 (2018) (European limits)

Test date: 2021-1-27

Start time: 16:49:04

Test duration (min): 2.5

Data file name: H-000021.cts\_data

Comment: Working mode

Customer: ERC 102

Tested by: *Evan Zhang*

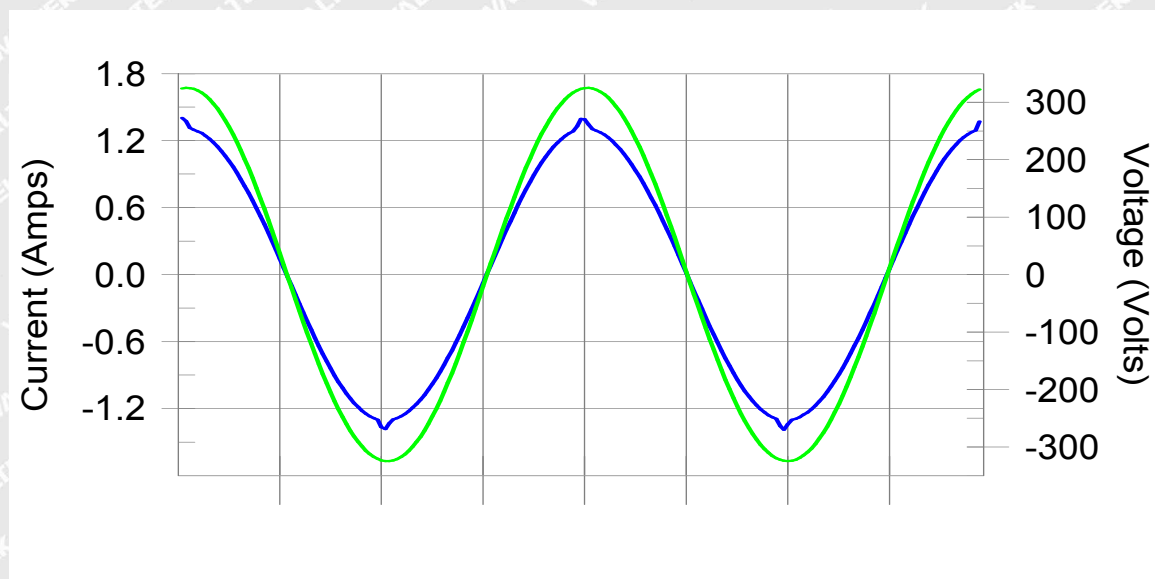
Test Margin: 100

End time: 16:51:45

Test Result: Pass

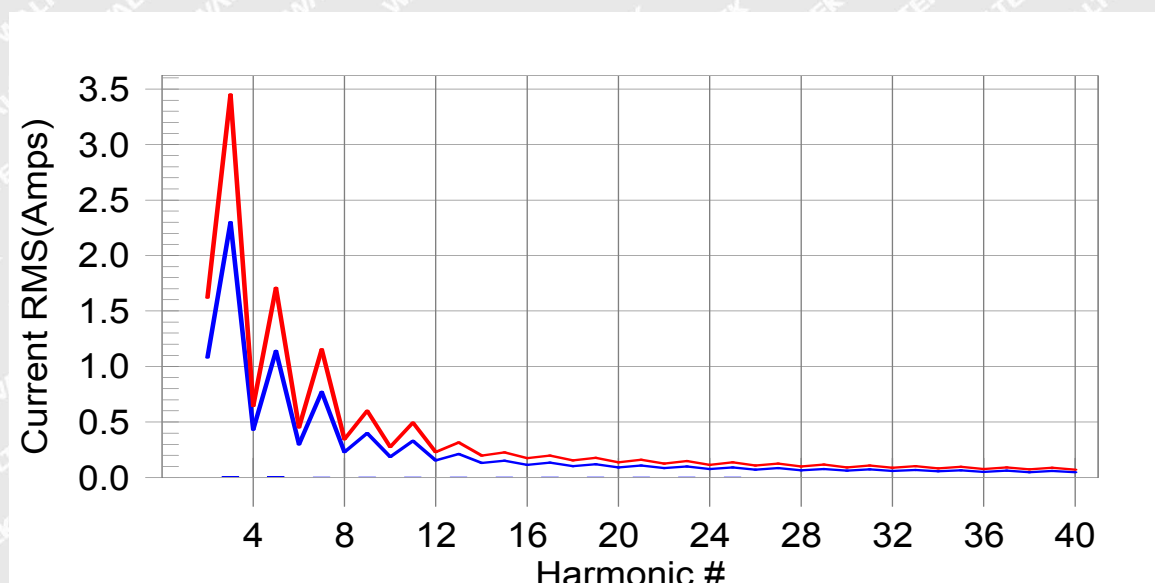
Source qualification: Normal

#### Current & voltage waveforms



#### Harmonics and Class A limit line

#### European Limits



**Test result: Pass** **Worst harmonics H3-0.2% of 150% limit, H3-3% of 100% limit**

Waltek Testing Group Co., Ltd.

<http://www.waltek.com.cn>



### Current Test Result Summary (Run time)

EUT: Wireless Receive Controller

Tested by: Tested by

Test category: Class-A per Ed. 5.0 (2018) (European limits)

Test Margin: 100

Test date: 2021-1-27

Start time: 16:49:04

End time: 16:51:45

Test duration (min): 2.5

Data file name: H-000021.cts\_data

Comment: Working mode

Customer: ERC 102

Test Result: Pass

Source qualification: Normal

THC(A): 0.016

I-THD(%): 1.7

POHC(A): 0.006

POHC Limit(A): 0.251

Highest parameter values during test:

V\_RMS (Volts): 229.93

Frequency(Hz): 50.00

I\_Peak (Amps): 1.416

I\_RMS (Amps): 0.931

I\_Fund (Amps): 0.931

Crest Factor: 1.521

Power (Watts): 214.1

Power Factor: 1.000

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.007	2.300	0.3	0.008	3.450	0.2	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.005	1.140	N/A	0.006	1.710	N/A	Pass
6	0.001	0.300	N/A	0.001	0.450	N/A	Pass
7	0.005	0.770	N/A	0.005	1.155	N/A	Pass
8	0.001	0.230	N/A	0.001	0.345	N/A	Pass
9	0.005	0.400	N/A	0.005	0.600	N/A	Pass
10	0.001	0.184	N/A	0.001	0.276	N/A	Pass
11	0.005	0.330	N/A	0.005	0.495	N/A	Pass
12	0.001	0.153	N/A	0.001	0.230	N/A	Pass
13	0.004	0.210	N/A	0.004	0.315	N/A	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.004	0.150	N/A	0.004	0.225	N/A	Pass
16	0.001	0.115	N/A	0.001	0.173	N/A	Pass
17	0.004	0.132	N/A	0.004	0.198	N/A	Pass
18	0.001	0.102	N/A	0.001	0.153	N/A	Pass
19	0.003	0.118	N/A	0.004	0.178	N/A	Pass
20	0.001	0.092	N/A	0.001	0.138	N/A	Pass
21	0.003	0.107	N/A	0.003	0.161	N/A	Pass
22	0.001	0.084	N/A	0.001	0.125	N/A	Pass
23	0.003	0.098	N/A	0.003	0.147	N/A	Pass
24	0.000	0.077	N/A	0.001	0.115	N/A	Pass
25	0.002	0.090	N/A	0.002	0.135	N/A	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.002	0.083	N/A	0.002	0.125	N/A	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.002	0.078	N/A	0.002	0.116	N/A	Pass
30	0.000	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.000	0.058	N/A	0.000	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass



### Voltage Source Verification Data (Run time)

EUT: Wireless Receive Controller

Tested by: Tested by

Test category: Class-A per Ed. 5.0 (2018) (European limits)

Test Margin: 100

Test date: 2021-1-27

Start time: 16:49:04

End time: 16:51:45

Test duration (min): 2.5

Data file name: H-000021.cts\_data

Comment: Working mode

Customer: ERC 102

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 229.93

Frequency(Hz): 50.00

I\_Peak (Amps): 1.416

I\_RMS (Amps): 0.931

I\_Fund (Amps): 0.931

Crest Factor: 1.521

Power (Watts): 214.1

Power Factor: 1.000

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.067	0.460	14.50	OK
3	0.396	2.069	19.15	OK
4	0.062	0.460	13.47	OK
5	0.037	0.919	3.99	OK
6	0.026	0.460	5.66	OK
7	0.040	0.690	5.87	OK
8	0.009	0.460	1.87	OK
9	0.047	0.460	10.28	OK
10	0.009	0.460	1.90	OK
11	0.013	0.230	5.51	OK
12	0.012	0.230	5.35	OK
13	0.008	0.230	3.53	OK
14	0.006	0.230	2.56	OK
15	0.009	0.230	3.71	OK
16	0.009	0.230	4.11	OK
17	0.010	0.230	4.15	OK
18	0.015	0.230	6.53	OK
19	0.010	0.230	4.23	OK
20	0.025	0.230	10.82	OK
21	0.010	0.230	4.13	OK
22	0.004	0.230	1.87	OK
23	0.004	0.230	1.70	OK
24	0.004	0.230	1.79	OK
25	0.005	0.230	2.07	OK
26	0.002	0.230	1.08	OK
27	0.003	0.230	1.09	OK
28	0.002	0.230	0.98	OK
29	0.006	0.230	2.62	OK
30	0.003	0.230	1.17	OK
31	0.004	0.230	1.65	OK
32	0.002	0.230	0.71	OK
33	0.003	0.230	1.36	OK
34	0.002	0.230	1.08	OK
35	0.004	0.230	1.81	OK
36	0.002	0.230	0.73	OK
37	0.004	0.230	1.64	OK
38	0.002	0.230	0.83	OK
39	0.005	0.230	2.11	OK
40	0.010	0.230	4.52	OK



## 6.5 Voltage Fluctuation and Flicker

Test Requirement..... : EN 61000-3-3

Test Method..... : EN 61000-4-15

Test Result ..... : ☒ Pass ☐ Fail ☐ not applicable (Remark)

### 6.5.1 E.U.T. Operation

Operating Environment:

Temperature..... : 21.5°C

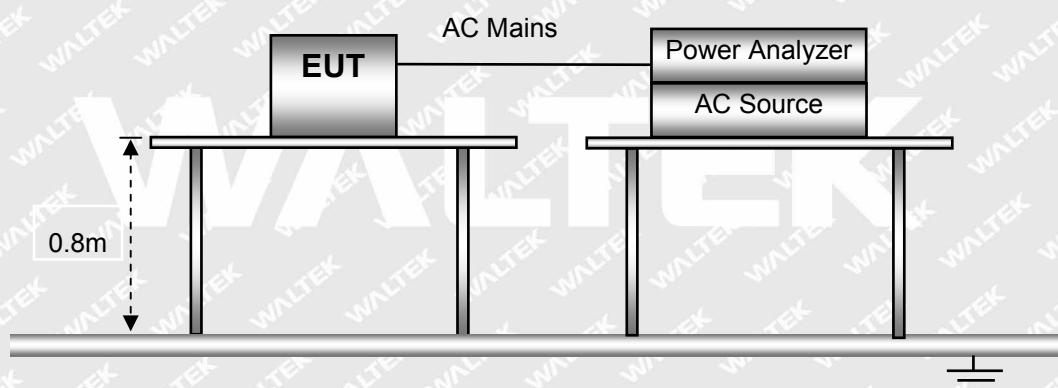
Humidity..... : 54.1%RH

Atmospheric Pressure ..... : 101.2kPa

EUT Operation..... : Refer to section 5.5.

### 6.5.2 Block Diagram of Setup

The Voltage Fluctuation and Flicker test was performed in accordance with the EN 61000-4-15.





### 6.5.3 Test Data

#### Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

EUT: Wireless Receive Controller

Test category: All parameters (European limits)

Test date: 2021-1-27

Test duration (min): 10

Comment: Working mode

Customer: ERC 102

Tested by: *Erin Zhang*

Test Margin: 100

End time: 16:46:04

Start time: 16:35:37

Data file name: F-000020.cts\_data

Test Result: Pass

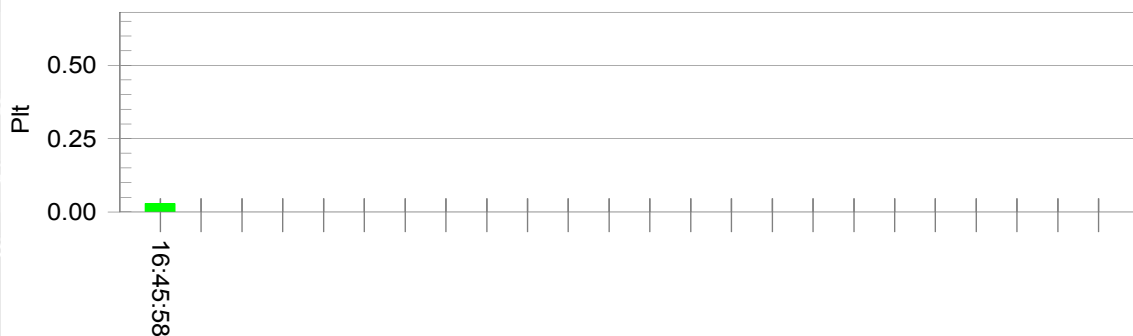
Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



#### Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.50

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.064

Highest Plt (2 hr. period): 0.028

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

Waltek Testing Group Co., Ltd.

<http://www.waltek.com.cn>



## 7 Immunity Test Results

### 7.1 Performance Criteria

**Performance criterion A:** The apparatus shall continue to operate as intended during the test.

No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

**Performance criterion B:** The apparatus shall continue to operate as intended after the test.

No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

**Performance criterion C:** Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operations specified in the instructions for use.

For further details, please refer to EN 55035.

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## 7.2 Electrostatic Discharge (ESD)

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-2
Test Result .....	: Pass
Discharge Impedance .....	: 330Ω / 150pF
Discharge Voltage .....	: Air Discharge: ±8kV Contact Discharge: ±4kV HCP & VCP: ±4kV
Polarity.....	: Positive & Negative
Number of Discharge .....	: Minimum 50 times at each test point(25 of each polarity)
Discharge Mode .....	: Single Discharge
Discharge Period.....	: 1 second minimum

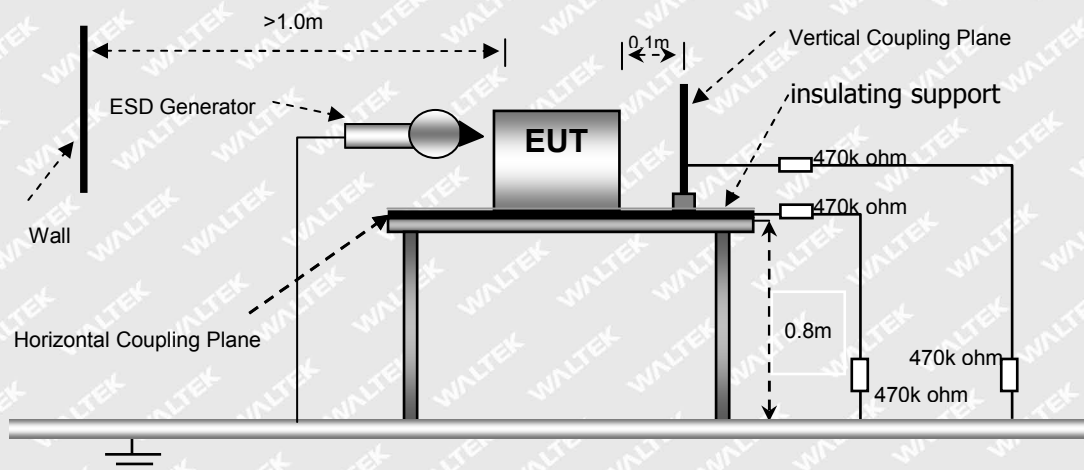
### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature.....	: 22.8°C
Humidity.....	: 54.7%RH
Barometric Pressure.....	: 100.8kPa
EUT Operation.....	: Refer to section 5.5.

### 7.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.





### 7.2.3 Direct Discharge Test Results

Observations:

Test points:

1. All Exposed Surface & Seams;
2. All metallic part

Direct Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
±8	B	1	N/A	Pass
±4	B	2	Pass	N/A

### 7.2.4 Indirect Discharge Test Results

Observations:

Test points: 1. All sides.

Indirect Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
±4	B	1	Pass	Pass

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### 7.3 Radio-frequency electromagnetic fields

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-3
Test Result .....	: Pass
FrequencyRange.....	: 80MHz to 1GHz 1.8GHz, 2.6GHz, 3.5GHz, 5GHz
Test level .....	: 3V/m
Modulation .....	: 80%, 1kHz Amplitude Modulation.
Face of EUT .....	: Front, Back, Left, Right
Antenna polarisation.....	: Horizontal&Vertical

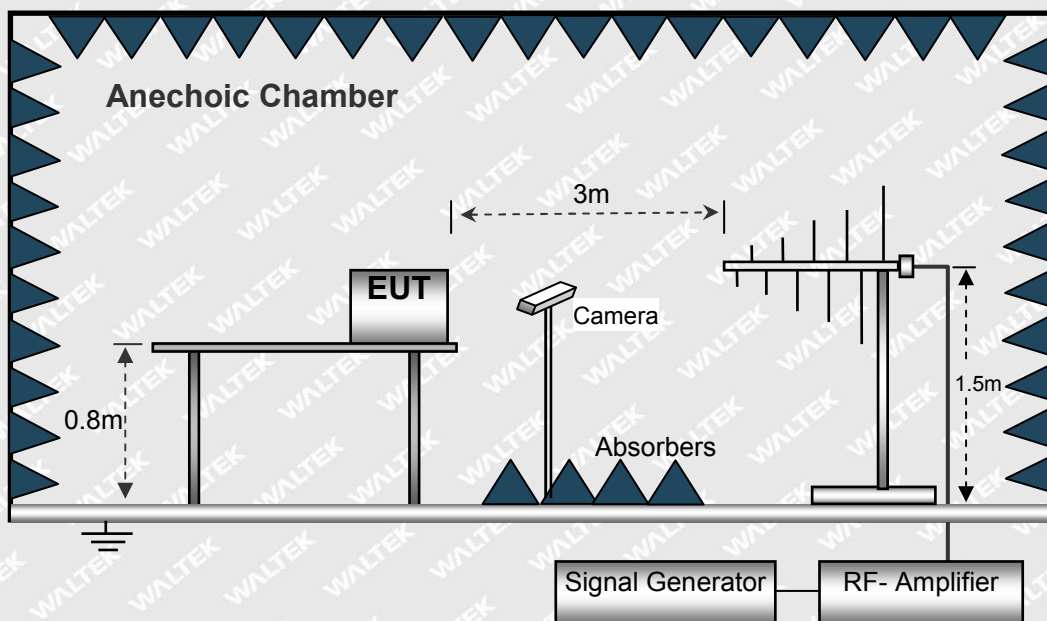
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature.....	: 21.7°C
Humidity.....	: 52.4% RH
Barometric Pressure.....	: 102.4kPa
EUT Operation.....	: Refer to section 5.5.

#### 7.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.





### 7.3.3 Test Results

Test Frequency (MHz)	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80-1000MHz 1800MHz, 2600MHz, 3500MHz, 5000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass
	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass

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## 7.4 Electrical Fast Transients (EFT)

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-4
Test Result .....	: Pass
Polarity.....	: Positive & Negative
Repetition Frequency .....	: 100 kHz : only for single lines of xDSL equipment 5 kHz : other
Burst Duration.....	: 300ms
Test Duration .....	: 2 minutes per level & polarity

### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature..... : 21.9°C

Humidity..... : 53.5%RH

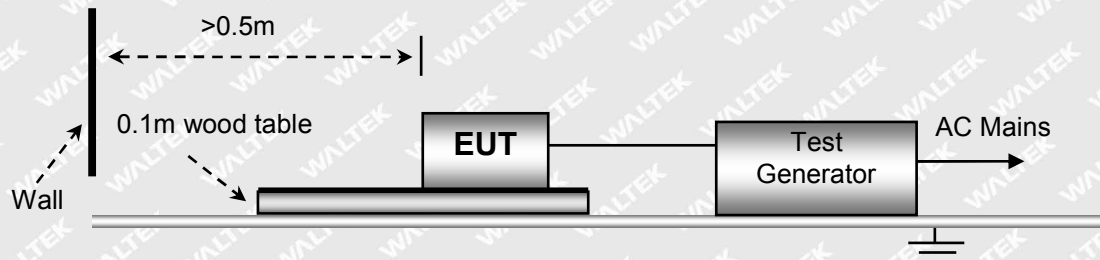
Barometric Pressure..... : 102.3kPa

EUT Operation..... : Refer to section 5.5.

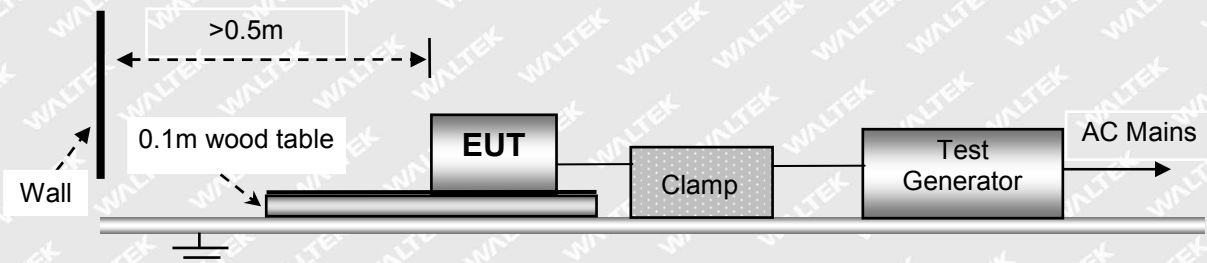
### 7.4.2 Block Diagram of Test Setup

The Electrical Fast Transients Immunity test was performed in accordance with the IEC 61000-4-4.

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:





### 7.4.3 Test Results

TestPort	Test Level(kV)	Performance Criterion	Result
AC Mains	$\pm 1.0$	B	PASS
Analogue/Digital	$\pm 0.5$	B	N/A <sup>a</sup>
DC Network	$\pm 0.5$	B	N/A <sup>a</sup>

Remark:

- <sup>a</sup> Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.

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## 7.5 Surges

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-5
Test Result .....	: Pass
Wave-Shape.....	: Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Generator Source Impedance...	: 2 ohm between networks 12 ohm between network and ground
Interval.....	: 60s between each surge
No. of surges .....	: 5 positive at 90° 5 negative at 270°

### 7.5.1 E.U.T. Operation

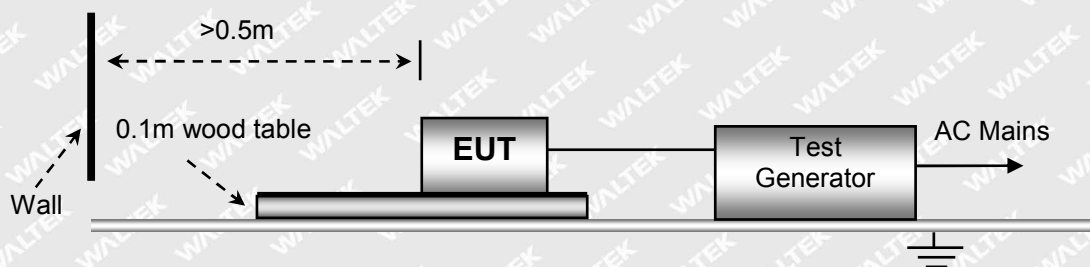
Operating Environment:

Temperature.....	: 22.5°C
Humidity.....	: 53.1%RH
Barometric Pressure.....	: 101.2kPa
EUT Operation.....	: Refer to section 5.5.

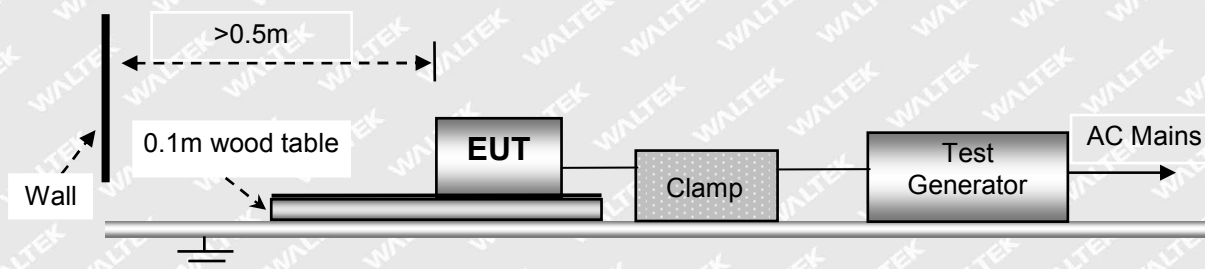
### 7.5.2 Block Diagram of Test Setup

The Surges Immunity test was performed in accordance with the IEC 61000-4-5.

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:





### 7.5.3 Test Results

TestPort	Applied Voltage (kV)	Performance criterion	Result
AC Mains (Between Live And Neutral)	$\pm 1$	B	PASS
AC Mains (Between Live And Earth)	$\pm 2$	B	N/A
AC Mains (Between Neutral And Earth)	$\pm 2$	B	N/A
Analogue/Digital	$\pm 1$ and 4	C	N/A <sup>abcf</sup>
	$\pm 1.0$	C	N/A <sup>abdf</sup>
	$\pm 0.5$	B	N/A <sup>aef</sup>
DC Network	$\pm 0.5$	B	N/A <sup>af</sup>

#### Remark:

- a Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables.
- b Port type: unshielded symmetrical, Apply: lines to ground.
- c Apply where primary protection is intended
- d Apply where primary protection is not intended
- e Port type: coaxial or shielded, Apply: shield to ground
- f Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.



## 7.6 Injected Currents Immunity

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-6
Test Result .....	: Pass
FrequencyRange.....	: 0.15MHz to 80MHz
Test level .....	: 0.15MHz to 10MHz for 3V r.m.s. 10MHz to 30MHz for 3 to 1Vr.m.s. 30MHz to 80MHz for 1V r.m.s. (unmodulatedemf into 150 $\Omega$ )
Modulation.....	: 80%, 1kHz Amplitude Modulation.

### 7.6.1 E.U.T. Operation

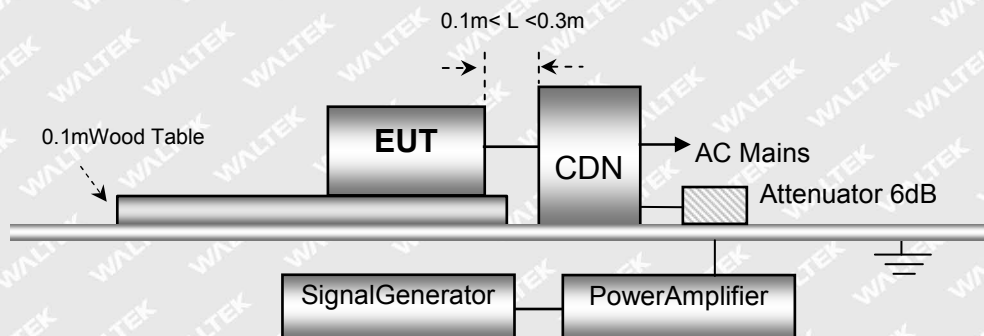
Operating Environment:

Temperature.....	: 23.4°C
Humidity.....	: 51.2% RH
Barometric Pressure	: 103.2kPa
EUT Operation.....	: Refer to section 5.5.

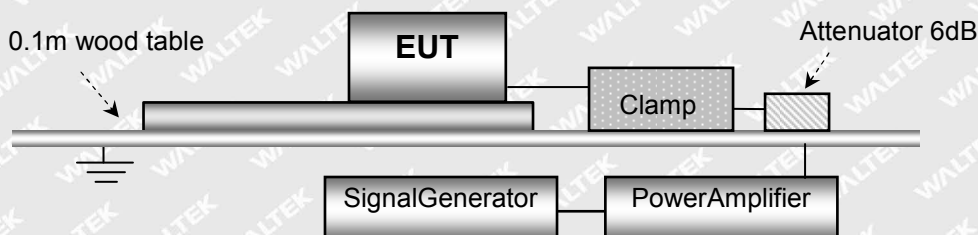
### 7.6.2 Block Diagram of Test Setup

The Injected Currents Immunity test was performed in accordance with the IEC 61000-4-6.

For AC Mains or DC Input:



For Signal or Telecommunication Ports:





### 7.6.3 Test Results

FrequencyRange	Line	Test Level	Modulation	Step Size	Dwell Time	Performance Criterion	Result
0.15MHz to 10MHz	AC mains	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	PASS
10MHz to 30MHz		3 to 1Vr.m.s.					PASS
30MHz to 80MHz		1Vr.m.s.					PASS
0.15MHz to 10MHz	Analogue/ Digital	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	N/A <sup>a</sup>
10MHz to 30MHz		3 to 1Vr.m.s.					N/A <sup>a</sup>
30MHz to 80MHz		1Vr.m.s.					N/A <sup>a</sup>
0.15MHz to 10MHz	DC Network	3Vr.m.s.	80%, 1kHz Amp. Mod.	1%	1s	A	N/A <sup>a</sup>
10MHz to 30MHz		3 to 1Vr.m.s.					N/A <sup>a</sup>
30MHz to 80MHz		1Vr.m.s.					N/A <sup>a</sup>

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## 7.7 Voltage Dips and Interruptions

Test Requirement.....	: EN 55035
Test Method.....	: IEC 61000-4-11
Test Result .....	: Pass
Frequency Range.....	: 0% & 70% & 0 % of $U_T$ (Supply Voltage)
No. of Dips / Interruptions	: 1 per Level at 20ms intervals

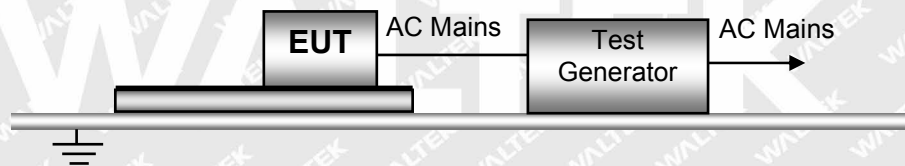
### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature.....	: 23.5°C
Humidity.....	: 53.8%RH
Barometric Pressure.....	: 102.4kPa
EUT Operation.....	: Refer to section 5.5.

### 7.7.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the IEC 61000-4-11.



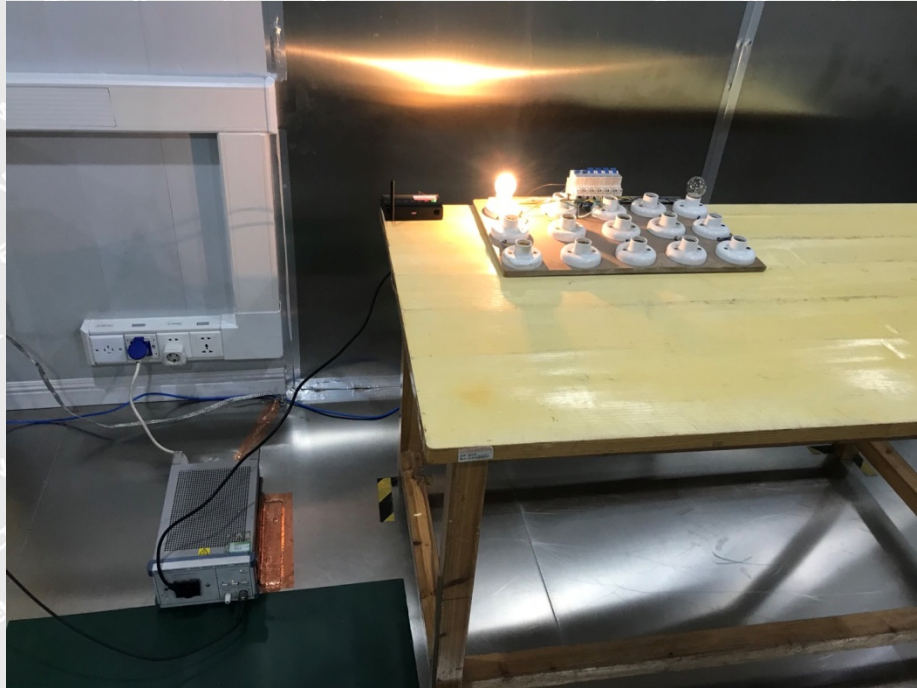
### 7.7.3 Test Results

Test Level in % $U_T$	Performance criterion	50Hz		60Hz	
		Duration	Result	Duration	Result
0	B	0.5	Pass	0.5	Pass
70	C	25	Pass	30	Pass
0	C	250	Pass	300	Pass



## 8 Photographs–Test Setup

### 8.1 Photograph–Conducted Emissions from the AC mains power ports Test Setup



### 8.2 Photograph–Radiation Emission Test Setup 30MHz-1000MHz





### 8.3 Photograph–RadiationEmission Test Setup Above 1GHz



### 8.4 Photograph –Harmonics&Voltage Fluctuation and FlickerTest Setup





### 8.5 Photograph – ESD Immunity Test Setup

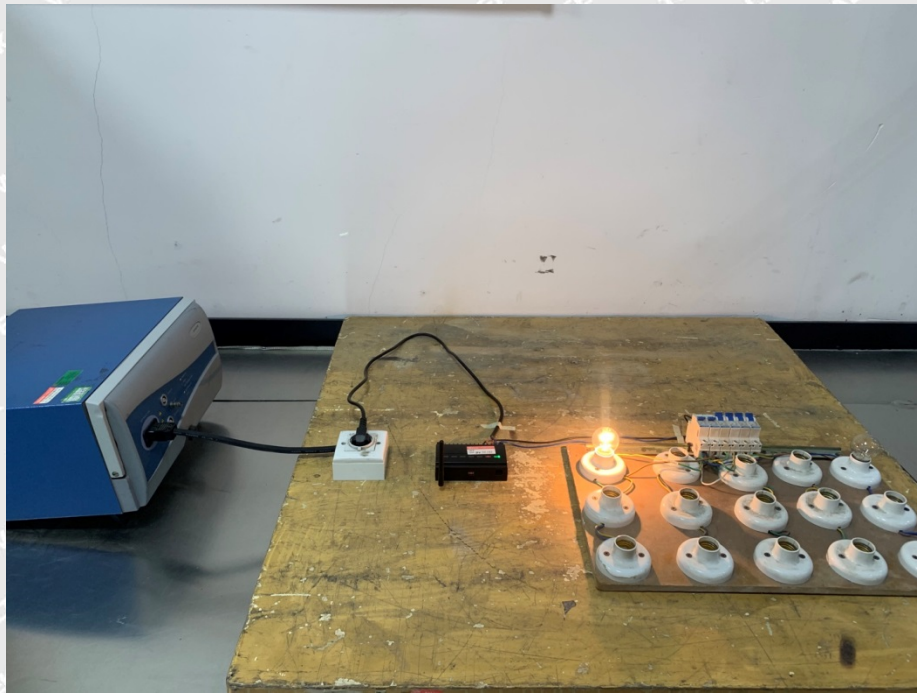


### 8.6 Photograph –Radio-frequency electromagnetic fields Test Setup





### 8.7 Photograph – EFT&Surges&Dips Immunity AC Mains Test Setup



### 8.8 Photograph – Injected Currents Immunity AC Mains Test Setup





## 9 Photographs of EUT

Note: Please refer to appendix:Appendix-ERC 102-Photos

=====End of Report=====

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